IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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SERIAL NO.:

FILED: Herewith

TITLE: INTERFEROMETRIC SYSTEM FOR THE SIMULTANEOUS MEASUREMENT OF THE INDEX OF REFRACTION AND OF THE THICKNESS OF TRANSPARENT MATERIALS, AND RELATED PROCEDURE

Preliminary Amendment: CLAIM AMENDMENTS

1. (Currently amended) System for ~~the~~ measurement of ~~the~~ index of refraction and ~~the~~ thickness of transparent materials, ~~made up~~ of a "shear interferometer" type, ~~characterized by the fact to be, in turn, made up of~~ said system comprising: a laser source ~~(1)~~, a supply ~~(2)~~, a collimator ~~(4)~~, a precision rotating stage ~~(7)~~, a photodiode ~~(9)~~, an oscilloscope ~~(10)~~, a control bus IEEE-488 ~~(12)~~, and a personal computer ~~(11)~~.

2. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 1, ~~characterized by the fact that the~~ wherein said laser source ~~(1) is such as to vary the~~ varies emission wavelength, for example, through the supply ~~(2)~~, and controlled through bus IEEE-488 ~~(12)~~ by a personal computer ~~(11)~~.

3. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 1, ~~characterized by the fact that the~~ wherein an acquisition system can be chosen optionally, i.e. a photodiode ~~(9)~~ interfaced with an oscilloscope ~~(10)~~ controlled, through bus IEEE-488 ~~(12)~~, by a personal computer ~~(11)~~.

4. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, ~~characterized by the fact that the~~ according to Claim 1, further comprising a sample ~~(5) is formed by~~ comprised of homogeneous material of plane and parallel faces.

5. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 4, ~~characterized by the fact that the~~ wherein said sample ~~(5)~~ is placed vertically on a support ~~(6)~~ and rests on a precision rotating stage ~~(7)~~, whose position is on the direction of the laser beam ~~(13)~~.

6. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to ~~Claims 1, 4 and 5, characterized by the fact that the~~ Claim 1, wherein laser radiation ~~(13)~~ which traverses the sample is subject to various reflections and refractions within the sample ~~(5)~~ which, by interfering with" each other, produce ~~the~~ an interferometric signal ~~(14)~~.

7. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to ~~the previous claims, characterized by the fact that~~ Claim 1, wherein, to perform the measurement of the index of refraction and the thickness of the analyzed sample ~~(5)~~, ~~it is necessary to determine first the~~ measurement of the optical path is first determined and subsequently ~~the~~ index of refraction of the sample ~~(5); from~~ is determined, wherein these two values ~~the~~ enable thickness of the investigated sample ~~(5) is~~ to be evaluated.

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8. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 7, ~~characterized by the fact that the~~ wherein measurement of the optical path occurs by evaluating the interferometric signal obtained upon varying of the angle of incidence ~~(8)~~ for each fixed wavelength of the laser source ~~(1)~~; and wherein, from ~~the~~ symmetry of the signal acquired on the personal computer ~~(11)~~ it is possible to determine the normal incidence condition ($\theta=0°$); and wherein, from the interferometric signal relating to said position it is possible to acquire the optical path inside the sample ~~(5)~~.

9. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 8, ~~characterized by the fact that,~~ wherein, by analyzing the interferometric signal according to the angle of incidence ~~(8)~~ and for a fixed wavelength, and using the value of the previously evaluated optical path, it is possible to acquire the value of the index of refraction of the analyzed sample ~~(5)~~.

10. (Currently amended) System for the measurement of the index of refraction and the thickness of transparent materials, according to Claim 9, ~~characterized by the fact that,~~ wherein, by using the value of the optical path and of the index of refraction it is possible to acquire the thickness of the analyzed sample ~~(5)~~.

11. (Currently amended) Procedure to measure the index of refraction and the thickness of transparent materials, according to ~~all the previous Claims, to be performed as follows:~~ Claim 1, comprising the steps of:

~~provide~~ <u>providing</u> a support that serves to house the material whose index of refraction and the thickness are to be measured;

<u>placing</u> said support ~~is placed~~ on a precision rotating stage and then duly inserted in the measurement system so that the sample to be measured is traversed by a coherent and monochromatic light beam;

<u>subjecting</u> the coherent light that traverses the sample ~~is subject~~ to various reflections and refractions at the sample interfaces, producing an interference signal;

<u>obtaining an optical path</u> from observation of the phase variation of the interference signal, following the variation of the wavelength of the coherent light~~, the optical path is obtained~~;

<u>obtaining index of refraction of the material</u> from said optical path and observing the interference signal, obtained for each fixed wavelength of the coherent light source~~, the index of refraction of the material is obtained~~; <u>and</u>

<u>obtaining thickness of the sample to be measured</u> from said index of refraction value and from the optical path value ~~the thickness of the sample to be measured is obtained~~.

12. (Currently amended) System, and related procedure, for measurement of the index of refraction and the thickness of transparent materials, ~~characterized by the fact that it can be used also for liquids~~ <u>according to Claim 1, wherein said material is a liquid</u>.